

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F21-R-47

Name: Sheridan Lake

County: Pennington

Legal description: Sec. 11-14 T1S R5E; and Sec. 7 T1S R4E

Location from nearest town: 5 miles east and 2 miles north of Hill City, SD

Dates of present survey: June 12, and July 21-22, 2014

Date last surveyed: May 23-25, June 2, and July 18-19, 2013

Most recent lake management plan: F21-R-38

Date: 2006

Management classification: Warmwater permanent

Contour mapped: June 2012

Primary Species: (game and forage)

Secondary and other species:

1. Rainbow trout
2. Yellow perch
3. Black crappie
4. Largemouth bass
5. Smallmouth bass
6. _____
7. _____
8. _____

1. Northern pike
2. Golden shiner
3. Green sunfish
4. White sucker
5. European rudd
6. Black bullhead
7. Rock bass
8. Brown trout

PHYSICAL CHARACTERISTICS

Surface Area: 383 acres

Watershed: 95,311 acres

Maximum depth: 96 feet

Mean depth: 30 feet

Lake elevation at survey: unknown (full)

Ownership of lake and adjacent lakeshore property

Sheridan Lake was constructed by the Civilian Conservation Corps for recreational purposes in 1939. Sheridan Lake and its dam are maintained and operated by the United States Forest Service (USFS). The operation and maintenance of campgrounds, picnic areas, parking lots, and boat launch facilities are managed under a special use permit by non-government entities. These entities also cooperate with the USFS during major maintenance and improvement in the off season. The marina and concession operations are leased to private enterprise under other long-term use permits (Personal communication with Amy Ballard, USFS, 1995).

Land use

The ownership of the Sheridan Lake watershed is approximately 86 USFS (81,818 ac) and 14% private (13,493 ac) (Personal communication Jon Macy, USFS, 1994). The bulk of USFS land is managed for timber production, but is also grazed through a permit process. Most of this land is covered by pine or spruce forest interspersed with meadows. Logging, thinning, and other timber management practices are ongoing. Private land is often less forested and more often used as horse pasture, cattle grazing land, home sites, or campgrounds. The watershed also contains the town of Hill City and several other small developments. Small reservoirs including Mitchell, Major, Newton Fork and several unnamed farm ponds are located within the

watershed. Most of the watershed consists of hills with moderate to steep inclines. Roads and trails are prevalent throughout the watershed.

Fishing Access

Sheridan Lake has boat launches on the north and south ends of the lake. Shore fishing is accessible via roads at both locations with floating fishing docks in both locations. Several floating docks are also located at a parking lot off of SD Hwy 385 on the west end of the lake. This area was renovated in the fall of 2012 to include a concrete stairway, ADA accessible ramp to the fishing piers and ice fishing access. Improvements were also made to the south boat ramp at the same time.

Observations of Water Quality and Aquatic Vegetation

Abundant emergent vegetation, primarily cattails, is present in the shallow ends of bays, along shallow shoreline areas, and near the inlets of Spring and Horse Creeks. Submergent vegetation is abundant throughout the lake at depths of six to eight feet. Algae blooms sometimes occur during the summer months and filamentous algae is found at times along the shoreline. Sheridan Lake is also infested with curly leaf pond weed which fills some bays.

Siltation occurs at all inlets, especially the Spring Creek and Horse Creek inlets, and is caused by agricultural use (grazing), timber/logging operations, highway runoff, and natural erosion.

Observations on condition of structures, (i.e. spillway, level regulators, boat ramps, etc.)

A faulty valve in the dam prevented controllable water releases from Sheridan Lake into Spring Creek during 2003. This valve was repaired in late 2004 and attempts have been made recently to open the valve, but it is not a part of lake or stream management at this time. Recent higher water years, since 2008 have allowed water to go over the spillway, significantly adding to flows in Spring Creek.

MANAGEMENT OBJECTIVES

Objective 1. Maintain a mean gill net CPUE of stock-length yellow perch equal to or greater than 20, a PSD of 30-60.

Objective 2. Maintain a secondary fishery of rainbow trout through stocking catchable size fish.

Objective 3. Maintain a largemouth bass population with a minimum nighttime electrofishing CPUE for stock-length and longer fish equal to or greater than 40, PSD range between 40 and 70, and a PSD-P equal to or greater than 10.

Objective 4. Maintain a smallmouth bass population with a minimum nighttime electrofishing CPUE for stock-length fish of 20, PSD range between 40 and 70, and a PSD-P equal to or greater than 10.

BIOLOGICAL DATA

Sampling Effort

Two gill nets were set on July 22, 2014 at approximately 15-20 ft deep, the depth where oxygen usually drops below a habitable level for fish during the July survey (Table 1, Figure 1). Nets remained in the water overnight for a total of two gill net nights.

Night electrofishing was conducted at Sheridan Lake on June 12, 2014 to sample largemouth bass and smallmouth bass. Six 10-minute sites were completed.

Table 1. Net locations for 2014 fisheries survey of Sheridan Lake.

Set Date	Net #	UTM Lat	UTM Long
7/22	Gill 1	4870356	622353
7/22	Gill 2	4869626	623239

Results and Discussion

Five species were caught in gill nets with yellow perch making up the majority (90.1%) of the catch (Table 2). In past surveys more species have been caught, such as black crappie, black bullhead, golden shiner, and European rudd. During the night electrofishing portion of these surveys, only largemouth and smallmouth bass were targeted. Discussion on primary species sampled during this survey completes this report.

Table 2. Total catch for two 150 ft experimental gill nets set in Sheridan Lake, South Dakota on July 22, 2014. Parameters are reported with confidence intervals.

Species	N	CPUE (80%)	CPUE-S (80%)	PSD (90%)	PSD-P (90%)	$Wr \pm S$ (90%)
Northern pike	1	0.5 (1.5)	0.5 (1.5)	100	0	110.7
Rainbow trout	5	2.5 (4.6)	2.5 (4.6)	0	0	89.9 (4.3)
Rock bass	2	1.0 (0)	1.0 (0)	0	0	81.2
White sucker	1	0.5 (4.1)	0.5 (4.1)	100	100	99.3
Yellow perch	82	41.0 (6.2)	40.0 (9.2)	40 (9)	1 (2)	105.5 (0.2)

Largemouth bass

During one hour of night boat electrofishing 107 largemouth bass were captured (Table 3). This is similar to 2012-2013 and over twice as many fish than in 2008-2011. However, surveys prior to 2011 were completed in early fall rather than spring and must be considered when comparing years.

Sheridan Lake is managed under a 15 inch (381 mm) minimum angling regulation for largemouth bass. The size structure of largemouth bass has been good with a PSD of 64 and PSD-P of 17 in 2014. This is exceeding the management goal of a PSD value of 40 to 60 and a PSD-P value of 10. The 2014 length-frequency histogram shows a sample of fish ranging from 80 mm to over 500 mm (19.9 in) (Figure 3). Fish condition (Wr) continues to be very good, ranging from 99 to 106 over the past ten years (Table 3).

Ages of largemouth bass from the 2014 survey indicated most were three to seven years old (Table 4). Some fish were aged past seven, but because it is very difficult to age these fish, their values are not included. Growth in 2014 was estimated as slightly faster than the past two surveys. Largemouth bass still range one to three inches per year slower than the SD mean and half an inch per year slower than the Region 1 (western SD) mean (Figure 2) (Willis et. al 2001). The Sheridan Lake bass are reaching stock length (200 mm or 8 in) at about three years of age; whereas on statewide average bass reach this length in two to three years.

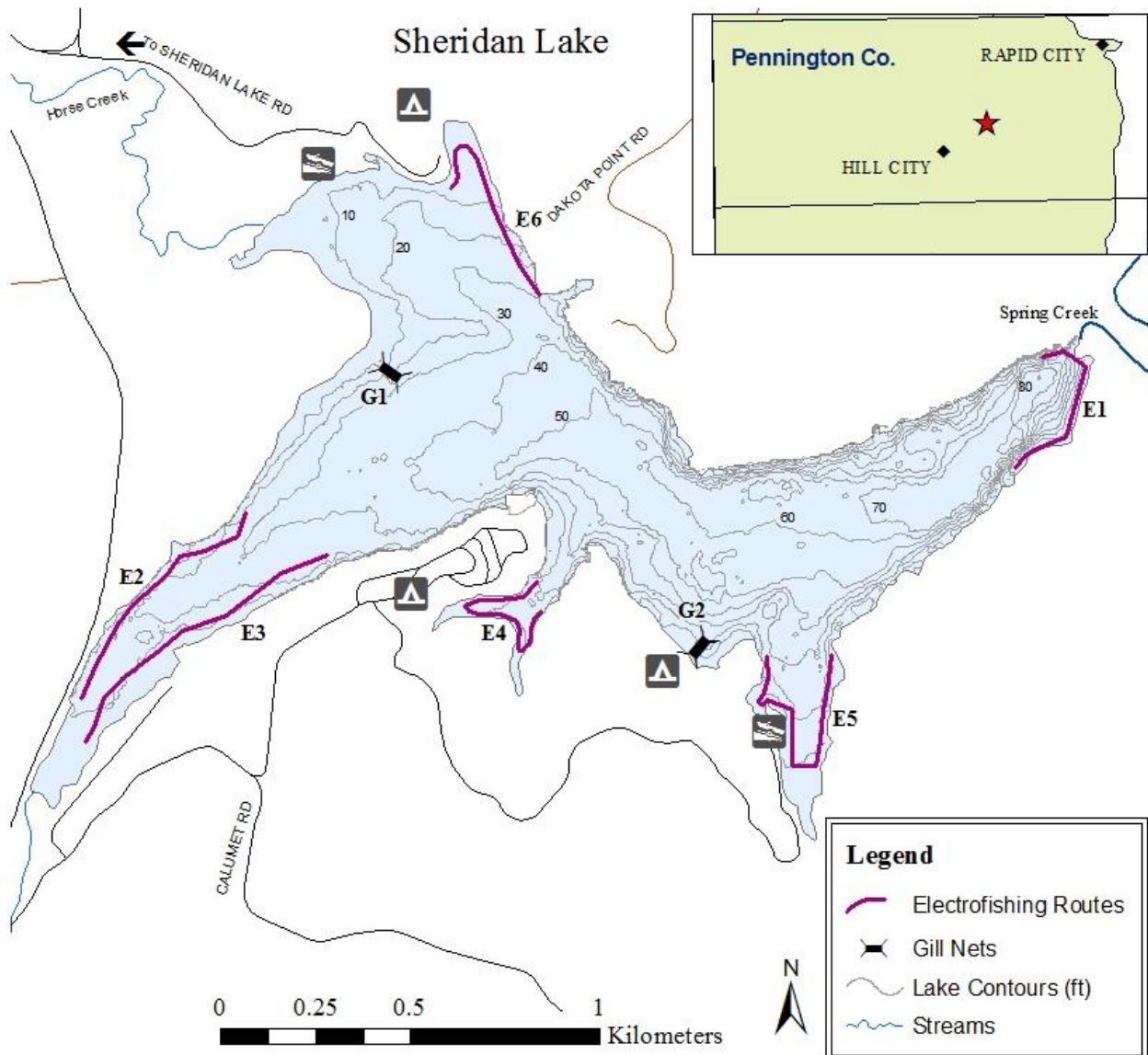


Figure 1. Map of Sheridan Lake with 2014 survey locations depicted.

Table 3. Results of largemouth bass captured during night electrofishing surveys of Sheridan Lake, 2003 - 2014.

Month/Year	N	Effort (sec)	CPUE (80%)	CPUE-S (80%)	PSD (90%)	PSD-P (90%)	W _r ±S (90%)
9/2004	57	3,600	57 (20)	38 (19)	37 (14)	3 (4)	102 (1.4)
9/2005	57	3,488	58 (23)	33 (20)	39 (14)	0	99 (1.3)
9/2007	111	3,450	115 (25)	102 (23)	26 (8)	1 (2)	104 (0.6)
9/2008	54	3,600	54 (22)	46 (19)	61 (12)	9 (7)	105 (1.7)
9/2009	50	3,550	50 (17)	37 (13)	43 (14)	0	104 (1.1)
9/2010	62	3,600	62 (39)	42 (30)	31 (12)	7 (7)	101 (1.8)
5/2011	52	3,676	52 (19)	50 (19)	34 (11)	10 (7)	98 (1.4)
6/2012	113	2,400	170 (50)	152 (59)	42 (9)	6 (4)	107 (1.0)
6/2013	101	3,600	101 (20)	75 (15)	56 (10)	5 (4)	106 (0.2)
6/2014	107	3,600	107 (25)	75 (19)	64 (9)	17 (8)	99 (0.3)

Table 4. Length (mm) at age (yr) for largemouth bass surveyed in Sheridan Lake by night electrofishing in 2014, with population means for 2012-2013 and the statewide and region 1 (western S.D.) means.

Age →			1	2	3	4	5	6	7
Year	Age	N							
2012	2	4	104	167					
2011	3	14	71	127	176				
2010	4	21	71	154	215	260			
2009	5	6	76	150	227	269	300		
2008	6	10	75	149	226	287	331	357	
2007	7	8	62	129	198	249	289	323	351
2014 mean			73	142	205	264	305	337	355
2013 mean			69	139	202	257	292	321	351
2012 mean			67	119	167	221	267	302	326
Statewide mean			96 (3)	182 (6)	250 (7)	305 (8)	342 (8)		
Region 1 mean			78 (4)	154 (10)	214 (11)	272 (13)	318 (13)		

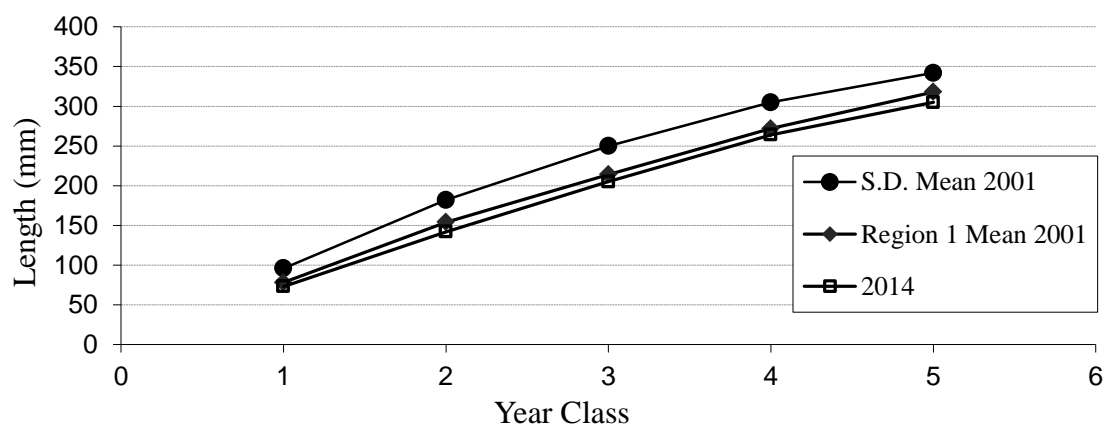


Figure 2. Length-at-age for largemouth bass captured in Sheridan Lake by night electrofishing in 2014 plotted with the South Dakota mean and Region 1 (western South Dakota) mean.

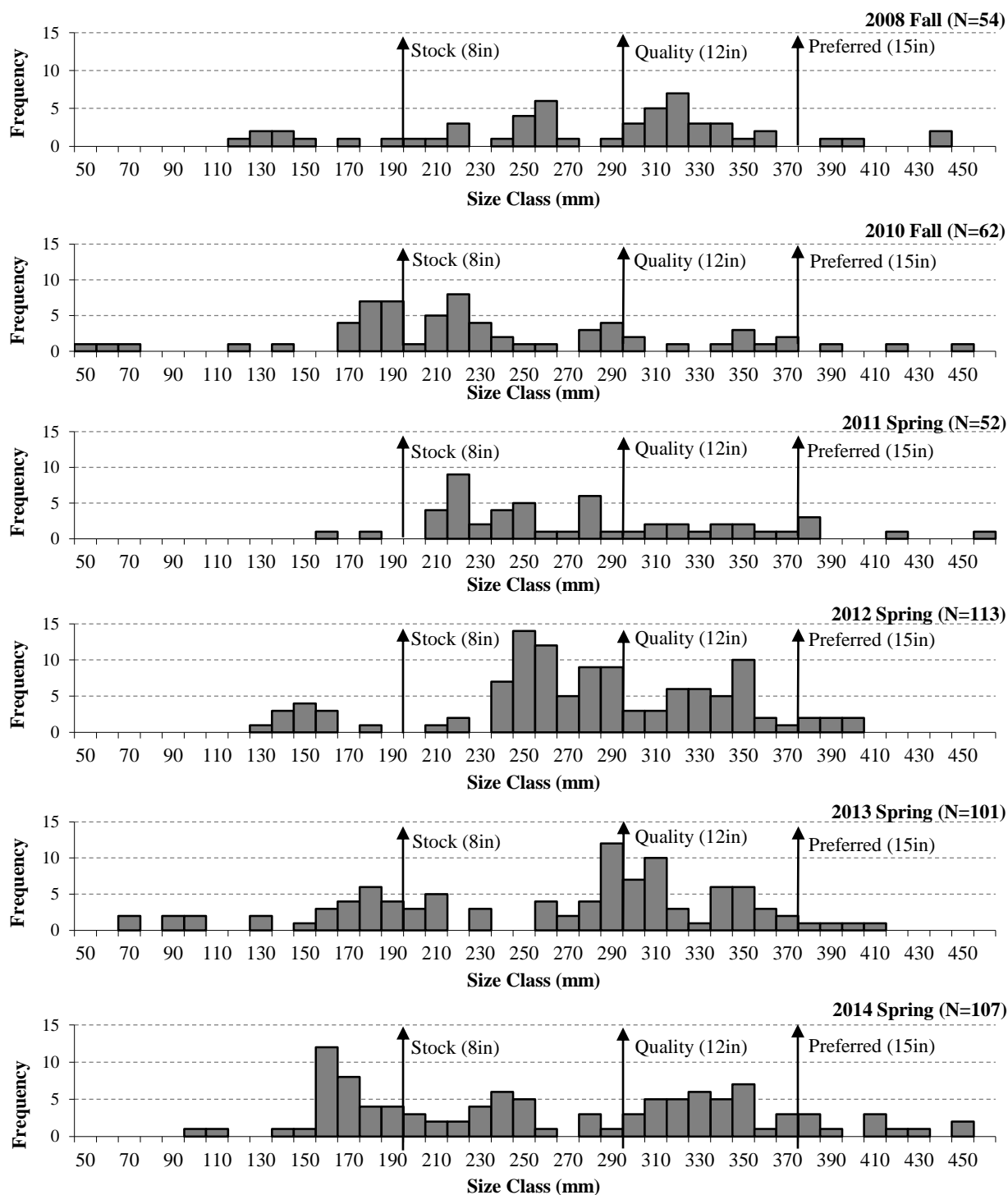


Figure 3. Length frequency histograms for largemouth bass collected by night electrofishing from Sheridan Lake, South Dakota, 2008, 2010-2014.

Smallmouth bass

Smallmouth bass fingerlings were stocked into Sheridan Lake in 2010 and 2011 (13,400 total), with adults stocked in 2011 and 2012 (485 total). During the 2014 electrofishing survey, one of the six passes was altered in order to include the face of the dam and adjacent shorelines. Ten smallmouth bass were captured ranging from 90 to 350 mm (Figure 4). Aging of smallmouth bass indicated three and four year old fish (Table 5). Two individuals were older, but age rings could not be accurately delineated.

The management goal for the future of smallmouth bass in Sheridan Lake is to maintain a population with a minimum nighttime electrofishing CPUE for stock-length fish of 20, PSD range between 40 and 70, and a PSD-P equal to or greater than 10.

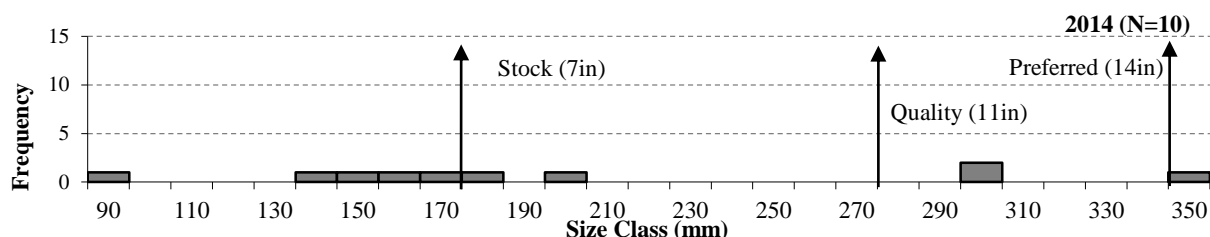


Figure 4. Length frequency histograms for smallmouth bass collected by night electrofishing from Sheridan Lake, South Dakota in 2014.

Table 5. Length (mm) at age (yr) for largemouth bass surveyed in Sheridan Lake by night electrofishing in 2014, with population means for 2012-2014 and the Statewide and Region 1 (western S.D.) means.

Age →			1	2	3	4	5	6	7
Year	Age	N							
2011	3	2	83	134	182				
2010	4	6	96	152	203	244			
2014 mean			89	143	192	244			
Statewide mean			91 (2)	171 (4)	242 (6)	300 (8)	333 (8)		
Region 1 mean			85 (4)	154 (10)	224 (17)	270 (30)	330 (31)		

Yellow perch

Gill net catch per unit effort of yellow perch has been high in 2011-2014 (Table 6). Proportion of yellow perch over quality length (PSD) and over preferred length (PSD-P) was at its lowest level with values of 40 and 1, respectively. These values are still within the management goal of a PSD of 30-60. Condition (*Wr*) for yellow perch captured in gill nets has been excellent and remained relatively constant with values over 100. Catch rates and size structure during an annual survey can vary due to many factors and lower numbers do not necessarily reflect a problem with the fishery. In Sheridan Lake, only two gill nets are fished, therefore, net placement, net depth, oxygen levels and other factors can cause survey values to vary.

Length frequency histogram shows a sample of fish mostly ranging from 150-250 mm (Figure 5). Yellow perch in Sheridan Lake may not grow much over 240 mm, possibly due to high fishing pressure and/or lack of forage. A winter creel census was completed in 2010-2011 and

estimated that anglers harvested around 7,700 perch in Jan-March with a high proportion of harvested fish over 220 mm (Simpson 2011).

Otoliths were taken from yellow perch captured in gill nets (Table 7). A majority of fish were aged at two to seven years old with a large age-3 year class. Some Sheridan Lake yellow perch do exhibit faster growth reaching quality length (200 mm or 8 in) around age-3, but on average it takes four years for them to grow to this length. This is similar to the South Dakota scale aged mean but faster than the Region 1 (Western South Dakota) mean (Willis et. al, 2001). Some older yellow perch exist in Sheridan Lake and since 2010 five fish have been aged at 11-14 years old.

Table 6. Catch data, stock indices, and condition for yellow perch captured with gill nets in Sheridan Lake, South Dakota, 2004 - 2014. Confidence intervals are reported in parentheses.

Year	N	Effort	CPUE (80%)	CPUE-S (80%)	PSD (90%)	PSD-P (90%)	Wr-S (90%)
2004	231	2	115.5 (113.9)	115.5 (113.9)	81 (4)	7 (3)	98.1 (0.4)
2005	89	2	44.5 (84.6)	44.5 (84.6)	83 (6)	8 (5)	97.4 (0.7)
2006	193	2	96.5 (238.5)	71.0 (160.1)	78 (6)	1 (2)	99.4 (0.5)
2007	54	2	27.0 (15.4)	27.0 (15.4)	93 (6)	11 (7)	96.5 (0.8)
2008	92	2	46.0 (12.3)	46.0 (12.3)	98 (3)	20 (7)	100.4 (0.1)
2009	21	2	10.5 (13.8)	10.5 (13.8)	100	24 (17)	100.3 (2.3)
2010	14	4	3.5 (3.1)	3.5 (3.1)	93 (13)	14 (17)	103.5 (2.5)
2011	148	2	74.0 (0)	74.0 (2.0)	74 (8)	10 (4)	101.8 (1.2)
2012	219	2	110.0 (60.0)	108.0 (55.0)	79 (4)	11 (3)	106.2 (0.4)
2013	162	2	81.0 (156.9)	80.5 (155.4)	64 (6)	18 (5)	100.4 (0.7)
2014	82	2	41.0 (6.2)	40.0 (9.2)	40 (9)	1 (2)	105.5 (0.2)

Table 7. Sheridan Lake yellow perch minimum, maximum, and weighted mean lengths (mm) by age (from otoliths) for fish caught in experimental gill nets during the 2014 fishery survey, and Region 1 and Statewide mean lengths by age (from scales) (Willis et al. 2001).

Age	Minimum	Weighted Mean length	Maximum	N	Region 1 Mean	S. Dakota Mean
2	167	180	196	9	117	145
3	173	188	210	23	158	190
4	205	205	205	1	186	220
5	223	227	230	3	208	242
7	228	236	246	8	-	-
11	233	233	233	1	-	-

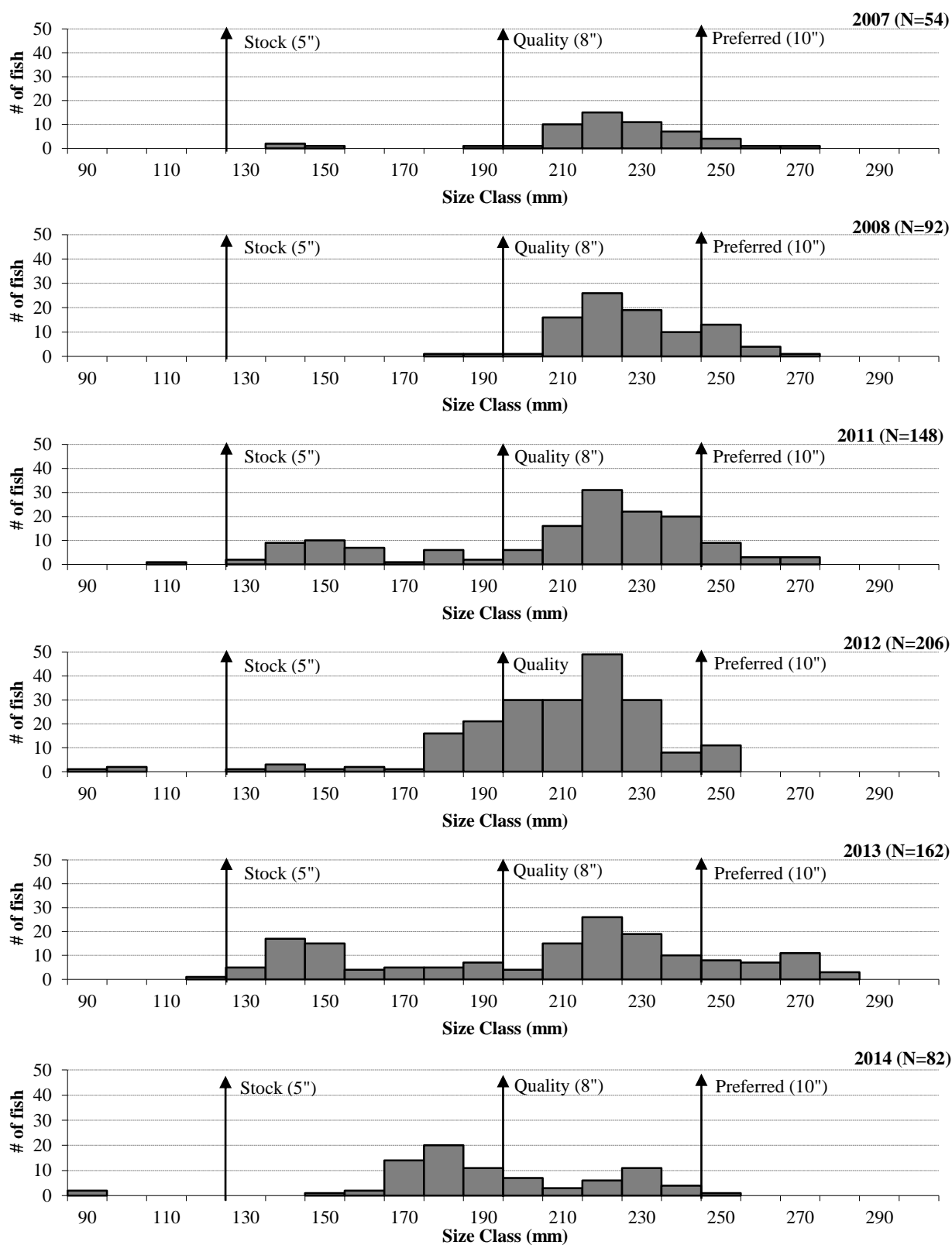


Figure 5. Length frequency histogram for yellow perch captured during gill net surveys of Sheridan Lake, South Dakota, 2007-2008, 2011-2014.

Rainbow trout

Five rainbow trout were captured in gill nets during the 2014 survey. Sheridan Lake was stocked with 10,000 catchable rainbow trout in April and May, over two months prior to the survey. A number of anglers report having high catch rates of rainbow trout over 14 in, indicating either a fast growth rate or carryover from prior years' stockings.

RECOMMENDATIONS

1. Continue stocking rainbow trout at current stocking rate.
2. Conduct annual lake survey in 2015.
 - a. Trap netting to be conducted in early summer as better suited for panfish catches.
 - b. YSI water chemistry profiles should be taken prior to net placement when gill netting.
 - c. Conduct night electrofishing during the spring for largemouth and smallmouth bass.

LITERATURE CITED

- Simpson, Greg. 2011. Angler Use and Harvest Survey on Sheridan Lake, South Dakota, January - March, 2011. South Dakota Game, Fish and Parks Completion Report F-21-R-43. Pierre, SD.
- Willis, David W. Daniel A. Isermann, Matthew J. Hubers, Bruce A. Johnson, William H. Miller, Todd R. St. Sauver, Jason S. Sorensen, and Eric G. Unkenholz. 2001. Growth of South Dakota Fishes: A Statewide Summary with Means by Region and Water Type. South Dakota Game, Fish and Parks Special Report. Pierre, SD.

APPENDIX

Appendix A. Stocking record for Sheridan Lake, South Dakota, 2007-2014.

Year	Species (Strain)	Size	Stockings	Number
2007	Brown trout (Soda Lake)	Catchable	1	726
	Rainbow trout (Erwin)	Catchable 11"	2	4,100
	Rainbow trout (Shasta)	Catchable	2	7,490
2008	Rainbow trout (Shasta)	Catchable 11"	1	3,582
	Rainbow trout (Utah)	Catchable	1	5,000
2009	Brown trout (Utah)	Catchable 11"	1	1,000
	Rainbow trout (Erwin)	Catchable	1	10,000
	Rainbow trout (McConaughy)	Catchable	3	10,637
	Rainbow trout (McConaughy)	Fingerling	1	6,000
2010	Brown trout (Soda Lake)	Catchable 11"	1	900
	Rainbow trout (Erwin X Arlee)	Catchable	1	9,000
	Rainbow trout (McConaughy)	Catchable	2	9,630
	Smallmouth bass	Fingerling	1	7,800
2011	Rainbow trout (Erwin X Arlee)	Catchable	1	7,920
	Rainbow trout (McConaughy)	Catchable	2	9,630
	Rainbow trout (Shasta)	Fingerling	1	7,933
	Smallmouth bass	Adults	1	200
	Smallmouth bass	Fingerling	1	5,600
2012	Rainbow trout (Erwin X Arlee)	Catchable	1	9,000
	Rainbow trout (McConaughy)	Catchable	2	10,000
	Smallmouth bass	Adult	1	285
2013	Rainbow trout (Erwin X Arlee)	Catchable	1	9,000
	Rainbow trout (McConaughy)	Catchable	2	10,000
	Smallmouth bass	Fingerling	1	6,890
2014	Rainbow trout (Erwin X Arlee)	Catchable	1	1,000
	Rainbow trout (Shasta)	Catchable	4	18,079